

Remarks

At the time of the Office Action dated September 10, 2007, claims 1-5, 7, 9-16, 18-26, 28, 30-32 and 34 were pending in the application and claims 1-5, 7, 9-16, 18-26, 28, 30-32 and 34 were rejected. By this paper, Applicants amend claims 1, 3-5, 7, 9, 12, 14-16, 18-20, 22 and 34. These amendments were not made as a result of any cited art. No new matter has been introduced by virtue of the present amendments. Applicants respectfully request reconsideration of the above application in view of the present amendments and following remarks.

Claims 15 and 16 stand rejected under the second paragraph of 35 U.S.C. § 112 because the limitation "molecular oxygen" does not have sufficient antecedent basis according to the Examiner. Without waiver or prejudice, Applicants have amended claims 15 and 16 to add the phrase "the air is comprised of molecular oxygen." Amended claims 15 and 16 provide antecedent basis for the limitation "molecular oxygen." Applicants, therefore, request the Examiner to withdraw this rejection of claims 15 and 16.

Claims 1-5, 7, 9-16, 18-26, 28, 30-32 and 34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kearl* (U.S. Pat. No. 6,677,070) in view of *Anzai et al.* (U.S. Pat. Pub. No. 2003/0060364). Applicants respectfully traverse this rejection because the proposed combination, if possible, does not teach or suggest the pending claims.

For example, pending method claim 1 recites "reacting molecular oxygen and a compound having formula 1: $\text{CH}_3\text{-O-R}$... at a sufficient temperature of less than about 650°C to form a reaction product mixture ... comprising a reaction product R." Method claim 1 further recites the step of "contacting the anode of a solid oxide fuel cell with the reaction product mixture to directly oxidize the reaction product including R."

The proposed combination of *Kearl* and *Anzai et al.* does not teach or suggest these limitations of pending claim 1. At best, *Kearl* discloses an "anode/fuel electrode 18 at which internal reforming (and consequent production of hydrogen) and/or direct oxidation of fuel

takes place." (Col. 4, ll. 65-67.) *Kearl* fails to teach the reaction of molecular oxygen and the compound having formula 1, and the reaction product mixture of carbon monoxide, molecular hydrogen and a reaction product including R. The Examiner agrees by stating that "*Kearl* ... fail[s] to teach the use of the specific mixtures of the instant claims." (Office Action, September 10, 2007, p. 3.)

Anzai et al. fails to address the defective teachings of *Kearl*. *Anzai et al.*'s teachings are limited to the following autothermal reforming process: "[i]n the case of using a gas as the feed stock in the autothermal reforming reaction, the gas preheated to a predetermined temperature is well-mixed with steam and air or oxygen and then introduced into a reactor filled with the catalyst." ¶ [0048]. The reforming process requires the reaction of the hydrocarbon feed stock, air or oxygen, and steam. The reformed gas product of this reaction of the three reactants is "composed principally of hydrogen." ¶ [0002].

Pending claim 1 recites a thermal composition reaction – not a reforming reaction. Claim 1 recites reacting "molecular oxygen and the compound having formula 1," whereas *Anzai et al.*'s teachings are limited to reacting a hydrocarbon feed stock, air or oxygen, and steam. Therefore, the reactants of *Anzai et al.* and those of the instant specification are not the same. For at least this reason, *Anzai et al.* does not teach or suggest pending claim 1.

Further, since the reactants of *Anzai et al.* and those of the instant specification are not the same, the reaction product mixtures are inherently different. Claim 1 recites "a reaction product mixture of carbon monoxide, molecular hydrogen and a reaction product including R." *Anzai et al.* teaches "a reformed gas [product] which is composed principally of hydrogen." *Anzai et al.* does not provide a reaction product including R. Therefore, *Anzai et al.* does not meet the reaction product mixture of pending claim 1.

Moreover, since *Anzai et al.* does not teach the claimed reaction product mixture, it also does not provide the claimed step of "contacting the anode of a solid oxide fuel cell with the reaction product mixture to directly oxidize the reaction product including R."

In light of the foregoing, the cited references, taken individually or in combination, do not teach or suggest the claimed invention as recited in claim 1 (or depending claims 2-5, 7 and 9-13). Therefore, Applicants respectfully request the Examiner to withdraw this rejection.

Pending claim 14 recites "reacting air and dimethyl ether ... at a sufficient temperature of less than about 650°C to form a reaction product mixture ... comprising methane." Method claim 14 further recites the step of "contacting the anode of a solid oxide fuel cell with the reaction product mixture to directly oxidize the methane." For at least the reasons set forth above, the cited references, taken individually or in combination, do not teach or suggest these limitations recited in claim 14 (or depending claims 15, 16, 18-21).

Pending claim 22 recites a fuel cell system including "a heat source surrounding the anode and the cathode ... the conduit and a portion of the inlet." As claimed, "the heat source heat[s] the first mixture [of molecular oxygen and a compound having formula 1] ... to form a reaction product mixture ... comprising ... a reaction product including R." The claim further recites that "the conduit contacts the anode ... with the reaction product mixture to directly oxidize the reaction product R."

For at least the reasons set forth above, the cited references, taken individually or in combination, do not teach or suggest these limitations recited in claim 22 (or depending claims 23-26, 28, 30-32 and 34).

Furthermore, the SOFC disclosed in *Kearl* and the reforming system of *Anzai et al.* are not properly combinable to provide pending claim 22. At best, *Anzai et al.* discloses "a process of producing a fuel gas for a fuel cell wherein hydrocarbons and/or oxygen-containing hydrocarbons are converted to a reformed gas which is composed principally of hydrogen." ¶ [0002]. This process includes the use of "a reactor filled with [a] catalyst." ¶ [0048]. The reactor output, i.e. a gas composed principally of hydrogen, is feed to a fuel cell. This fuel cell may be the SOFC disclosed in *Kearl*. Therefore, the combined teachings of *Anzai et al.* and *Kearl* require a separate reformer reactor and an SOFC.

Contrarily, claim 22 recites a system in which a thermal decomposition reaction occurs within an SOFC. The claimed system does not include a reformer for the supply of hydrogen fuel to the fuel cell. Instead, hydrocarbons and molecular oxygen are fed into the SOFC, as claimed, and are subjected to thermal decomposition, and the products of this reaction are contacted with the anode. For at least this reason, claim 22 (and depending claims 23-26, 28, 30-32 and 34) are patentable over the proposed combination of *Kearl* and *Anzai et al.*

Applicants do not acquiesce in the Examiner's characterizations of the art. For brevity and to advance prosecution, Applicants may not have addressed all characterizations of the art and reserve the right to do so in further prosecution of this or a subsequent application. The absence of an explicit response by Applicants to any of the Examiner's positions does not constitute a concession to the Examiner's positions. The fact that Applicants' comments have focused on particular arguments does not constitute a concession that there are not other arguments for patentability of the claims. Applicants submit that all of the dependent claims are patentable for at least the reasons given with respect to the claims on which they depend.

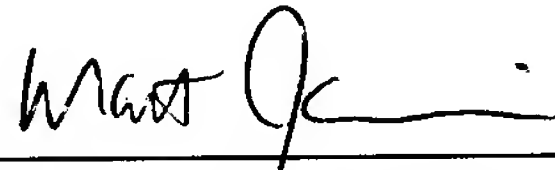
CONCLUSION

For the foregoing reasons, Applicant believes that the Office Action of September 10, 2007 has been fully responded to. Consequently, in view of the above amendments and remarks, Applicant respectfully submits that the application is in condition for allowance, which allowance is respectfully requested.

The Commissioner is hereby authorized to charge any fee deficiency associated with the filing of this Paper to the Deposit Account of Applicants' assignee, Ford Global Technologies LLC, Deposit Account No. 06-1510.

Respectfully submitted,

ERICA MURRAY ET AL.

By 
Matthew M. Jakubowski
Reg. No. 44,801
Attorney for Applicants

Date: January 10, 2008

BROOKS KUSHMAN P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075-1238
Phone: 248-358-4400
Fax: 248-358-3351